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## Introduction:

The main purpose of the GeoNetGNSS project, funded by the European Union and National Funds through the Region of Central Macedonia, is to establish a dense network of Continuously Operating Reference Stations (CORS) in Northern Greece to support geodetic, surveying, engineering, and mapping applications.

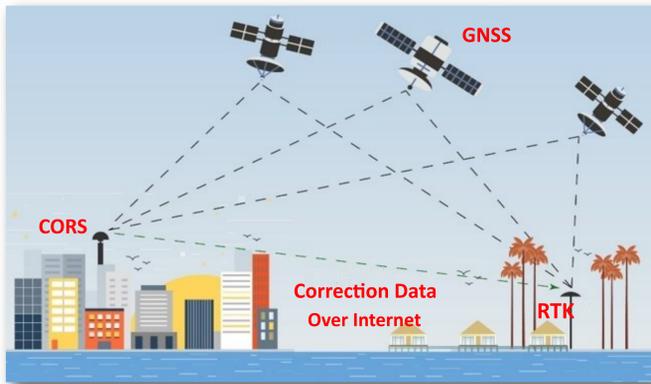
Given that the Greek local vertical datum (LVD) utilizes Helmert-type orthometric heights, the development of a regional high-accuracy and high-resolution gravimetric geoid model is mandatory in order to transform geometric heights into orthometric ones. In this work we summarize the collection of gravity and GNSS/Leveling data to densify the available land gravity database in Northern Greece.

In that frame, and given the geological complexity and topographic peculiarities of the region, gravity campaigns have been designed and carried out around the newly established CORS stations to densify the land gravity database. The observations have been carried out employing the GravLab CG5 relative gravity meter and dual-frequency GNSS receivers in RTK mode for orthometric height determination.

The gravity observations have been referred to GRS80/IGSN71, relative to the absolute gravity stations established by GravLab at the AUTH premises using the A10 (#027) absolute gravity meter. The orthometric heights relative to the Greek LVD were performed on collocated geodetic benchmarks from the Hellenic Military Geographic Service.

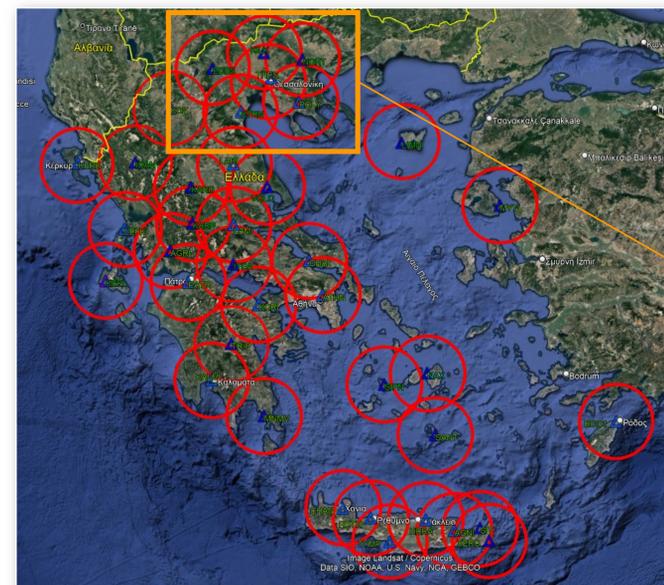
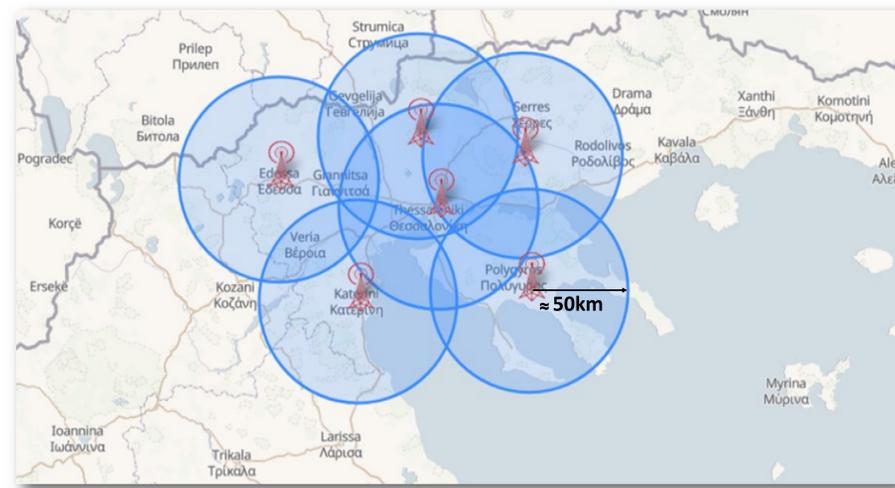
## Goal of the project:

The newly established network of CORS stations (6) has been planned to cover the geographic area of the Region of Central Macedonia (RCM), Greece.



- THESSALONIKI**  
**POLYGYROS**  
**EDESSA**  
**KILKIS**  
**KATERINI**  
**NIGRITA**
- CORS POSITION**

## The newly established Network of CORS:



The Continuously Operating Reference Stations (CORS) Network of RTK base stations provides National Navigation Satellite (GNSS) data.

The New CORS.

## Instrumentation & Field campaigns:

### CG-5 relative gravimeter:

- measurement range: >8000 mGal
- standard resolution: 0.001 mGal (1 μGal)
- standard deviation: <5 μGal

### Absolute A10 gravimeter:

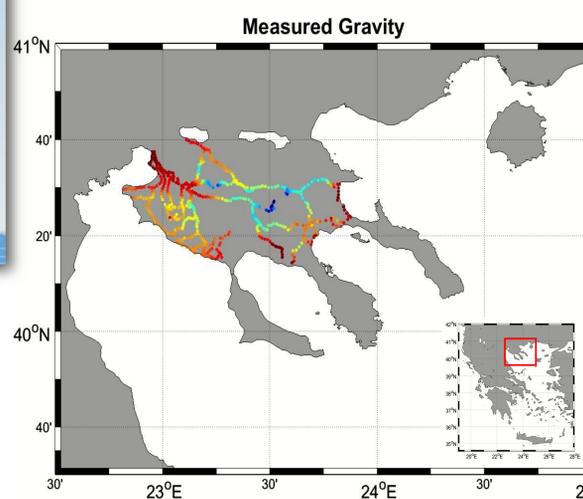
- AUTH reference point situated at the seismological station: 980276178.419 ±10.05 μGal

### Trimble R9s: GNSS receiver:

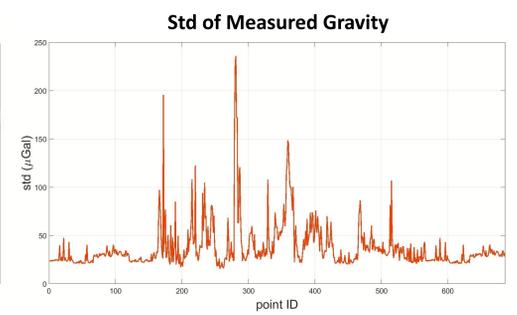
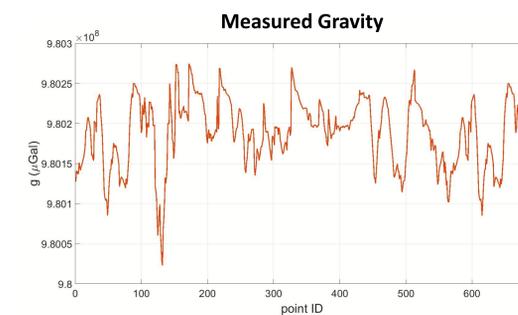
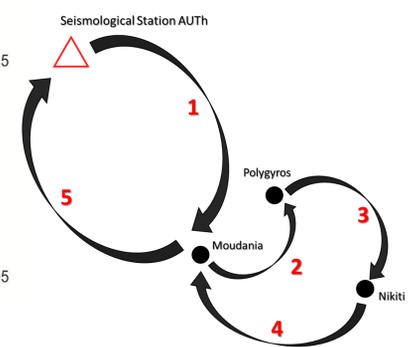
- RTK – accuracy:  
√ Horizontal: 8mm + 0.5 ppm  
√ Vertical: 15 mm + 0.5 ppm
- VRS, MAC



## Gravity Measurements & Data Processing:



## Measurement strategy:



ID Reference Station	g [μGal]	std [μGal]
Seismological Station AUTH	980269570.13	10.05
Moudania	980234216.95	37.58
Polygyros	980259782.77	17.81
Nigrita	980220423.27	25.52
Moudania	980234213.93	44.91
AUTH	980276178.42	10.05
AUTH1	980276288.72	26.94

## Conclusions:

Measurement campaigns to collect gravity and GNSS/Leveling data at selected sites around the newly established CORS stations. Densify the land gravity database given the geological complexity and topographic peculiarities of the region in order to determine a high-accuracy and resolution geoid.

All aforementioned data refer to the wider region close to POLYGYROS (mainly) and THESSALONIKI station.

Since the start of the project, 13 measurement campaigns have been carried out and 515 new gravity points with accurate position and height information have been established.

A mean measurement accuracy at the ~15-20 μGal level and ~3 cm has been achieved for the gravity measurements and orthometric heights, respectively.

## Acknowledgement:

This research was carried out as part of the project «GeoNetGNSS» (Project code: KMP6-0071139) under the framework of the Action «Investment Plans of Innovation» of the Operational Program «Central Macedonia 2014 2020», that is co-funded by the European Regional Development Fund and Greece.



REGION OF CENTRAL MACEDONIA  
MANAGING AUTHORITY  
O.P. Region of Central Macedonia



Co-financed by Greece and the European Union